GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION
SPONSORED PROJECT INITIATION

Date: June 15, 1979

Project Title: Organizational and Elaborative Encoding into Memory

Project No: G-42-630 Green card

Project Director: Dr. Anderson D. Smith

Sponsor: DHEW/PHS/NIH - National Institute of Mental Health; Bethesda, MD 20014

Agreement Period: From 6/15/79 Until 5/31/80 (01 Year)

Type Agreement: Grant No. 1 R03 MH33386-01

Amount: $ 8,254 PHS Funds (G-42-630)
4,663 GIT Contribution (G-42-318)
$12,917 Total

Reports Required: Interim Progress Report with Continuation Application; Terminal Progress Report upon Grant Expiration

Sponsor Contact Person (s):

Technical Matters

Contractual Matters
(thru OCA)

Bruce L. Ringler
Chief, Grants and Contracts
Management Branch
National Institute of Mental Health
Bethesda, MD 20014

Defense Priority Rating: N/A

Assigned to: Psychology (School/Laboratory)

COPIES TO:

Project Director
Division Chief (EES)
School/Laboratory Director
Dean/Director–EES
Accounting Office
Procurement Office
Security Coordinator (OCA)
Reports Coordinator (OCA)

Library, Technical Reports Section
EES Information Office
EES Reports & Procedures
Project File (OCA)
Project Code (GTRI)
Other

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

SPONSORED PROJECT TERMINATION

Date: 12/11/80

Project Title: Organizational and Elaborative Encoding into Memory

Project No: G-42-630

Project Director: A.D. Smith

Sponsor: DHEW/PHS/NIH - Nat'l Institute of Mental Heath; Bethesda, MD 20014

Effective Termination Date: 5/31/80 (01 year)

Clearance of Accounting Charges: 5/31/80

Grant/Contract Closeout Actions Remaining:

- _ Final Invoice and Closing Documents
- _ Final Fiscal Report
- X Final Report of Inventions
- _ Govt. Property Inventory & Related Certificate
- _ Classified Material Certificate
- _ Other _____

Assigned to: Psychology (School/Laboratory)

COPIES TO:

Project Director
Division Chief (EES)
School/Laboratory Director
Dean/Director–EES
Accounting Office
Procurement Office
Security Coordinator (OCA)
Reports Coordinator (OCA)
Library, Technical Reports Section
EES Information Office
Project File (OCA)
Project Code (GTRI)
Other C.E. Smith

CA–4 (1/79)

NAME AND ADDRESS OF GRANTEE INSTITUTION	TRANSACTION NO.	DATE OF THIS REPORTING PERIOD
Georgia Institute of Technology Atlanta, Georgia 30332	R 3MH33386A	FROM 6/15/79 TO 5/31/80
	INSTITUTIONAL ID NO.	PROJECT PERIOD
	G-42-630	FROM 6/15/79 TO 5/31/80
		☒ CHECK IF FINAL REPORT

1. Expenditures of DHEW Funds for this Reporting Period

a. Personnel	$	h. Alterations and renovations	
b. Consultant services		i. Other	
c. Equipment			
d. Supplies		j. Total direct costs	4,563.24
e. Travel, domestic		k. Indirect costs: Rate 76 % ☒ S&W ☐ TDC	
f. Travel, foreign		Base $ 3,880.06	2,948.85
g. Patient care costs		l. TOTAL	$ 7,512.09

2. Expenditures from Prior Periods (previously reported)	-0-
3. Cumulative Expenditures	7,512.09
4. Total Amount Awarded — Cumulatively	8,254.00
5. Unexpended Balance (Item 4 less Item 3)	741.91
6. Unliquidated Obligations	-0-
7. Unobligated Balance (Item 5 less Item 6)	741.91
8.a. Cost Sharing Information — Grantee Contribution This Period	4,662.72
b. % of Total Project Costs (Item 8a divided by total of Items 1 and 8a)	% 38.3
9.a. Interest/Income (enclose check)	-0-
b. Other Refundable Income (enclose check)	-0-

INSTITUTIONAL PRIOR APPROVAL SYSTE...
YES ☐ NO ☐
RETURN FORM TO:
NATIONAL INSTITUTE OF MENTAL HEALTH
5600 FISHERS LANE ; ROOM 7-99
ROCKVILLE, MARYLAND 20857

10. Remarks

I hereby certify that this report is true and correct to the best of my knowledge, and that all expenditures reported herein have been made in accordance with appropriate grant policies and for the purposes set forth in the application and award documents.

David V. Welch
SIGNATURE OF INSTITUTION OFFICER

12/8/80
DATE

David V. Welch, Manager, Grants & Contracts Accounting
404/894-4624

DHEW-489 (REV. 10/73) REPORT OF RESEARCH GRANT EXPENDITURES

OMB 85R0219

G42-630

FORM APPROVED
OMB NO. 68-R1452

DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
NATIONAL INSTITUTE OF MENTAL HEALTH

Month	Year
0 9	8 0
(01) (02)	(03) (04)

FINAL REPORT GUIDELINES

INSTRUCTIONS

PHS policy requires that grantees submit a "terminal progress report" (final report) within 90 days after completion of the grant.

Please complete this series of items *as this final report.* The report will be filed with your applications, reports and other grant business in NIMH's central files. It will be read by staff in research program areas, and may be read by other Institute staff concerned with program analysis, communication, evaluation and planning. The report will be used for information about your research, i.e., to describe and summarize the information *(procedural as well as substantive)* resulting from NIMH support, and to relate that information to mental health problems and research. Your report will often be used apart from your application; however, other documents, such as publications and applications, will be available from the project file if needed.

These guidelines have been designed with relatively small response spaces to encourage brevity. However, do not restrict your response if more space is needed: be complete, using additional labeled pages inserted where necessary *(sample page included).* Extensive descriptions and discussions, if desired, should be made *in addition to* your summary response to the item, and should be placed as appendices. Discussions of issues not covered by these guidelines are also welcome as appendices. Use clear, concise language, avoiding highly technical language *where practicable (this will vary for different types of research);* appendices could be more technical than responses to the items.

All publications resulting from this project, and not previously submitted, should be submitted with this report *(or as soon as available);* see the section on Dissemination. Publications should *not* be used in lieu of responses to particular items.

nd copies of this report and all appendices as indicated below.

All Grants
Send 3 copies *

TO: GRANTS CLOSEOUT UNIT
GRANTS MANAGEMENT BRANCH
OFFICE OF PROGRAM SUPPORT
NATIONAL INSTITUTE OF MENTAL HEALTH
5600 FISHERS LANE, ROOM 7C-18
ROCKVILLE, MARYLAND 20857

Send two copies only of any books included.

FOR NIMH USE ONLY

Branch/Section: ___ ___ ___

MINISTRATIVE
TA:

OTE: *If items 1-4 e changed, give the st information)*

1. GRANT NUMBER

R	0	3	M	H	3	3	3	8	6
(05)	(06)	(07)	(08)	(09)	(10)	(11)	(12)	(13)	(14)

2. TITLE OF GRANT
ORGANIZATIONAL AND ELABORATIVE ENCODING INTO MEMORY

3. NAME OF PRINCIPAL INVESTIGATOR
Anderson D. Smith

4. SPONSORING INSTITUTION
Georgia Institute of Technology

SIGNATURE OF PRINCIPAL INVESTIGATOR
Anderson D. Smith

5. NAME AND POSITION OF PERSON WRITING THIS REPORT IF OTHER THAN ITEM 3

IM 442
~~2-75~~ 7/80

CONTINUE ON REVERSE SIDE

AIMS OF THE PROJECT:

6. Describe briefly the *specific aims* of your project, indicating major changes in direction from the original aims:

The objective of this research was an empirical specification of the encoding operations engaged in under standard learning conditions. An attempt was made to control different encoding operations (i.e., strategy) through the use of orienting tasks, and then to compare performance under these conditions to performance without such controlled encoding.

Two types of encoding were examined: elaboration, the distinctive encoding of each individual item in a list of to-be-remembered items; and organization, the encoding of each item in relation to other items in the list. Two types of retrieval also were examined: free recall, a task in which the subject must reproduce the items in the list; and recognition, a task in which the subject must select the presented items out of a longer list. Elaboration and organization were manipulated through the use of appropriate orienting tasks.

PROBLEM STUDIED)

The two major hypotheses were:

(1) In free recall, performance across trials was expected to be better with organizational encoding than with elaborative encoding. The standard group (learning instructions but no orienting task) was expected to perform at a level comparable to the group performing the organizational orienting task. This hypothesis was based on the assumptions that subjects spontaneously process the items at encoding according to their expectation of a recall task, and that organization is the optimal strategy for free recall and used when expecting such a task.

(2) In recognition, performance was expected to be better with the elaborative encoding task than with the organizational

(continued on page 8)

7. Were the aims pursued as *originally formulated?*

1 [X] Yes
2 [ ] No (15)

The experiments were conducted as orginally formulated to address the objectives and specific aims of the project.

YPE OF ESEARCH:

8. In general, how would you *characterize* your research?
(Rank any multiple answers, using "1" as most appropriate)

(16) [3] Hypothesis development
(17) [ ] Hypothesis testing
(18) [2] Development or refinement of methodology
(19) [ ] Gathering of data; e.g., surveys
(20) [ ] Other *(Specify):*

9. Describe the *methodology* used in your research, including characteristics of any sample used:

Fifteen subjects were randomly assigned to each of ten different conditions. The design of the experiment* is represented in Table 1 (Page 9). The subjects were solicited from introductory psychology classes at Georgia Institute of Technology. They received class credit or a small fee for participating. The ten conditions represented the combinations of two retrieval conditions (recall and recognition) and five different encoding conditions.

Standard. Subjects in the standard condition were instructed to try to remember as many items from the list as possible and to expect a later memory test. No specific mnemonic instructions or orienting tasks were used. Because subjects in the other encoding conditions engaged in orienting tasks and wrote responses during encoding in an answer booklet, subjects in the standard condition were asked to check off the number of each word as it was presented.

Organization. Subjects performing the organizational orienting task were asked to indicate in which of three categories listed in the answer booklet each word belonged. For each word, one of the three categories listed in the booklet was correct and

(continued on page 9)

*Recall and recognition were not directly compared. Therefore, the design can be considered to be two experiments.

10. Did you have significant *technical methodological* difficulties?
(Examples: necessary measurement tools undeveloped; unexpected inadequate data base)
If yes, describe, and explain how you dealt with them.

1 ☒ Yes
2 ☐ No (21)

Answer booklets were not adequately designed to prevent subjects from grouping words in recall at different places on recall sheet. This prevented an analysis of organization with the data (i.e., subjective organization analysis and clustering as to category). The recall subjects are being reproduced currently to reanalyze organizational measures.

11. Did you have significant *practical operational* difficulties?
(Examples: trouble with equipment; loss of sample or data; difficulties with cooperating units)
If yes, describe, and explain how you dealt with them.

1 ☐ Yes
2 ☒ No (22)

CONTINUE ON REVERSE SIDE

12. Describe (a) your *conclusions* or *results* as they relate to your specific aims *(please include negative results)*, and (b) their *significance* in relation to the field. Avoid highly technical language where practicable.

ESULTS:

Means and standard deviations for both recall and recognition performance are presented in Table 2. Recall and recognition were subjected to separate analyses. For recall, the mean number of correct responses on each of the three trials (Trl. in table) was included in the analysis, while in recognition, d' scores were used. With the recognition data, no differences were found between an analysis of the d' scores derived from signal detection theory from hits and false alarms, and an analysis using simple difference scores (correct minus incorrect responses).

Table 2. Means and standard deviations for recall and recognition data

ENCODING CONDITION		RECOGNITION (d')			RECALL (number correct)		
		Trl. 1	Trl. 2	Trl. 3	Trl. 1	Trl. 2	Trl. 3
STANDARD	$\bar{x}$	2.36	2.73	3.24	14.40	27.87	35.53
	s.d.	1.6	1.2	1.5	6.8	5.8	4.0
ORGANIZATION (3 cats.)	$\bar{x}$	3.00	3.46	3.70	16.73	26.33	30.87
	s.d.	1.6	1.3	1.7	4.3	6.5	6.7
ORGANIZATION (6 cats.)	$\bar{x}$	2.72	3.15	4.07	16.73	26.47	31.87
	s.d.	.63	1.2	1.3	6.1	4.3	4.2
ELABORATION (same)	$\bar{x}$	4.21	4.25	4.45	17.40	25.53	31.13
	s.d.	2.0	1.4	1.9	3.6	3.6	4.5
ELABORATION (different)	$\bar{x}$	4.39	4.37	5.07	18.80	26.27	32.09
	s.d.	2.1	2.2	2.2	3.7	6.0	4.0

The results of the analyses are summarized in the following list:

--- RECALL:

(1) There was no significant effect of encoding condition ($F = .219$)

(2) There was a significant effect of practice; trial 2 was better than trial 1, and trial 3 was better than trial 1 ($F(2, 140) = 480.9$, $p < .0001$).

(3) There was a significant interaction between encoding condition and stage of practice, $F(8, 140) = 46.75$, $p < .0001$).

--- RECOGNITION

(1) With recognition, there is a significant effect of encoding condition ($F(4, 70) = 4.09$, $p < .005$

(continued on page 11)

SULTS
ntinued)

13. Did you have *other findings* not directly related to the specific aims *("serendipitous findings")?*

If yes, describe:

1 [X] Yes (23)
2 [ ] No

(1) Organizational processing induced via orienting tasks did not facilitate recall performance. This suggests that such tasks do not produce optimal organizational processing.

14. How do the *overall results* of your project fit into these descriptions? *(If you had multiple expectations or hypotheses, base your response on the predominant trend of the results).*

[X] Confirming your hypotheses or expectations (24)
[ ] Disproving your hypotheses or expectations (25)
[ ] Inconclusive (26)

While there were some unexpected (as stated in #13) findings with the organizational orienting task, the results of these experiments support the differential susceptibility of recall and recognition to different encoding strategies. By comparing standard instructions to orienting tasks differences in recall and recognition were found.

15. Did your research result in significant *methodological developments?*

If yes, describe:

1 [X] Yes (27)
2 [ ] No

The orienting task paradigm is widely used in memory research, and the present results should provide some guidance into how this procedure controls memory strategy and processing at encoding.

MPLICATIONS:

16. How would you describe the *impact* of your project?
(Rank any multiple answers, using "1" as most appropriate)

(28) ☐ Opening up a new line of research
(29) ☒ Contributing to the knowledge base of the field
(30) ☐ Providing facts ready for application in a field
(31) ☐ Indicative of a "dead-end" line of pursuit

17. Do you have immediate plans for *further research* in this area? 1 ☒ Yes (32) 2 ☐ No

If yes, describe:

I plan to work more with the organizational task, trying to find a more controlled, orienting-task-like procedure that will more closely produce results like standard instructions. For example, one could have the subject list the category to which the word belonged, thus producing a more subject-generated organizational structure.

I also plan to analyze the current data for subjective organization (not yet complete). These data could provide some evidence as to whether subjects are actually organizing any differently from subjects in the standard condition. Some of the data is currently being re-collected, as some subjects

(continued on page 15)

18. Beyond your own plans, what is your opinion of the future directions this research area should take?

I believe that more and more investigators will become interested in the "qualitative" nature of encoding and will attempt to differentiate encoding strategies from each other. This research is a first attempt at doing this. There is currently in the memory field, a great deal of confusion as to the meaning of such terms as "elaboration", "organization", "depth-of-processing" etc. By comparing various orienting tasks and instructional conditions to standard instructions, some insight might be gained in the interpretation of these concepts.

19. Do you have *specific suggestions (experiments, cautions, etc.)* for other research in this area? 1 ☒ Yes (33) 2 ☐ No

If yes, describe:

We must more carefully define operationally what we mean by encoding strategy.

PLICATIONS

ntinued)

20. Are you aware of *other researchers* using your techniques, or planning to replicate your study, or of some individual or organization continuing your work? *If yes, describe, and check the type of impact which best characterizes the impact of your research at this time.*

1 [X] Yes
2 [ ] No (34)

[X] Specific utilization (35)

[ ] General field impact (36)

Of course, many researchers are using the orienting task paradigm and some researchers are now beginning to see the importance of qualitative type of processing. No longer will a single encoding dimension such as depth of processing be capable of explaining the findings found with orienting tasks. For example, the depth-of-processing conceptual framework does not address organization as a type of encoding.

21. As an appendix, list *all publications (and articles accepted for publication)* resulting from this project. Send any publications which have not already been submitted as *appendices*, with grant number indicated on each. *(See instructions, page 1, regarding submission of books)*

22. Do you have any plans for future publications, papers, and/or demonstrations dealing with the results of this project? If so, describe briefly. Send in any future publications based on this project as per instructions on page one.

1 [X] Yes
2 [ ] No (37)

It is planned to publish the results of this research in the near future.

SSEMINATION:

PENDICES:

See instructions, page 1, paragraph 3.

task. The standard group was expected to perform at a level comparable to the group performing the organizational task, but across trials it was expected to show more improvement than the group performing the organizational task. With experience on the recognition test, subjects in the standard group were expected to adapt their encoding strategy from an inappropriate organizational strategy to an optimal elaborative strategy.

Supporting hypotheses were:

(1) The organizational orienting task either required subjects to place the words into three categories (3 categories of 16 words) or six categories (6 categories of 8 words). With six categories, recall was expected to be better because it provides a better organizational structure for retrieval. The structure of organization (i.e., 3 vs. 6 categories), while important for recall, was not expected to affect recognition memory.

(2) The elaborative orienting task either required subjects to perform the same task on all three trials during learning, or to perform a different task on each trial. Performing different tasks was expected to produce less learning across trials in recall. In recognition, however, the different tasks were expected to lead to a more elaborative trace for each item, and thus better recognition performance.

Table 1. Basic design of project.

ENCODING CONDITION	RETRIEVAL CONDITION	Trial 1	Trial 2	Trial 3
Standard instructions	Recall	*		
	Recognition			
Organization task (Three categories)	Recall			
	Recognition			
Organization task (Six categories)	Recall			
	Recognition			
Elaboration task (Same tasks)	Recall			
	Recognition			
Elaboration task (Different tasks)	Recall			
	Recognition			

N = 15 for each cell; Encoding condition and retrieval condition are between-subject variables and trial is a within-subject variable (repeated measure).

the others represented categories selected from the remaining pool of categories for that condition. The subject made a check mark next to the appropriate category for each presented word. Two different organizational conditions were included in the experiment. One group placed the words into three categories and another placed the same words into six categories. The categories in the three-category condition were animal, plant, and non-living. The categories in the six-category condition were bird, mammal, vegetable, tree, tool, and furniture. The same list of words was presented to all subjects. For example, lettuce was checked as a plant in the three-category condition and a vegetable in the six-category condition.

Elaboration. The three orienting tasks used for the elaboration conditions were rating pleasantenss of the words, rating the vividness of the images elicited for the words, and rating the number of associations estimated for the words. For each task, subjects marked their rating on a three point scale (pleasant, neutral, unpleasant; vivid, average, not vivid; many associations, some associations, few associations). The order of the three tasks in the Different condition and the type of task in the Same condition were counterbalanced across subjects.

(continued on page 10)

The subjects were told what task to perform and how to do it on an instruction sheet prior to the presentation of the list on each trial.

Subjects.

The subjects were solicited from introductory psychology courses and gave their informed consent in writing prior to the experimental session. To insure confidentiality, names were never associated with individual performance. After the experiment the subjects were completely informed as to the nature of the experiment.

General procedure.

All subjects in all conditions were expecting a later memory test. Craik and Tulving (1975) have shown that the incidental nature of the orienting-task procedure is not important in determining memory performance. The subjects were presented the 48 words, one at a time, on a screen in front of them. A five-second rate was used. Three random orders of the words were used, one order on each of the three trials. All subjects received the same order of words on each trial. The subjects performed their respective checking tasks as each word was presented. After all of the words were presented, the subjects were administered either recall or recognition as the method of test.

Free recall. Subjects in the recall conditions were given three minutes to free recall as many words as possible. Subjects were asked to write down in their answer booklets as many words as they could remember.

Recognition. Subjects in the recognition condistions had a list of words in their answer booklet, and they had to pick out the words that were presented during learning. The filler items (distractors) on the recognition list were chosen from the same categories as the words in the presentation list. The words were selected from the Battig and Montague (1969) category norms, and the presentation items and filler items were equated in response frequency. Difference scores (correct minus incorrect responses) and d' scores (signal detection analysis) were measured.

(2) As in recall, there was a significant effect of stage of practice or trials ($F(2, 140) = 11.82$, $p < .0001$).

(3) Unlike recall, there is no interaction between encoding condition and stage of practice ($F = .783$).

The presence of an interaction in recall and the absence of an interaction in recognition is best depicted in Figure 1.

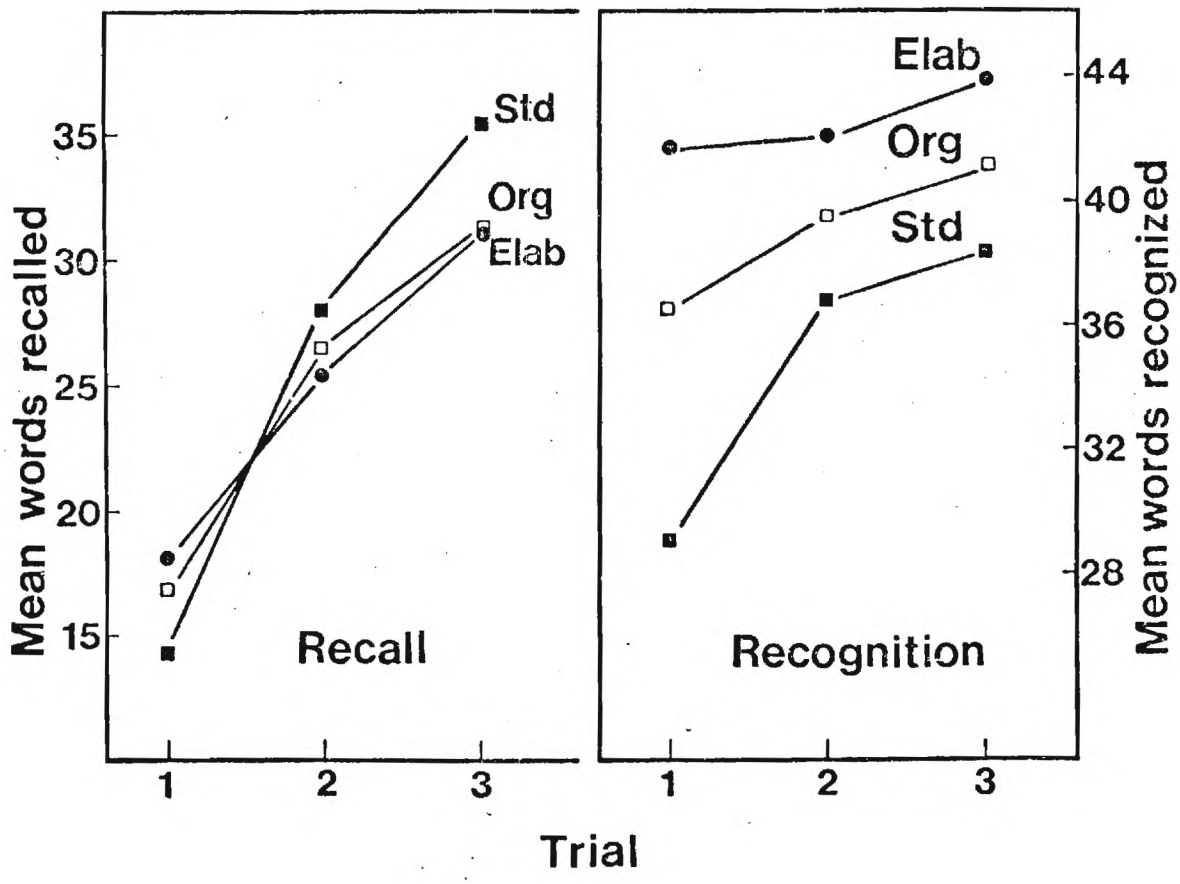

Figure 1. The relationship between stage of practice and encoding condition for both recall and recognition.

For the purpose of this figure, the two types of organizational condition and the two types of elaborative conditions were collapsed into the single curves represented in the figure. This was possible because no differences were found between the types of conditions. There was no difference between the same and different elaborative conditions, and there was no difference between the 3(12) and the 6(8) organization conditions.

(continued on page 12)

It is clear from the figure that the interaction in recall was due to the standard group. With standard instructions and no orienting task, the standard group increased its level of performance at a faster rate across trials than did either of the orienting-task conditions. While the standard group started on trial 1 below the orienting task conditions, on trial 3 it significantly was better than the other two encoding conditions. The organizational and elaborative conditions did not differ from each other. It was expected that the organizational condition would be more like the standard group because of the optimal nature of the organizational task to recall performance. However, the present result clearly shows that not to be the case. The organizational orienting task helped performance no more than did the elaborative task. Recall performance is further broken down in Figure 2. As seen in the figure and indicated earlier, there were no differences in any of the orienting-task conditions. The curves lie on top of each other.

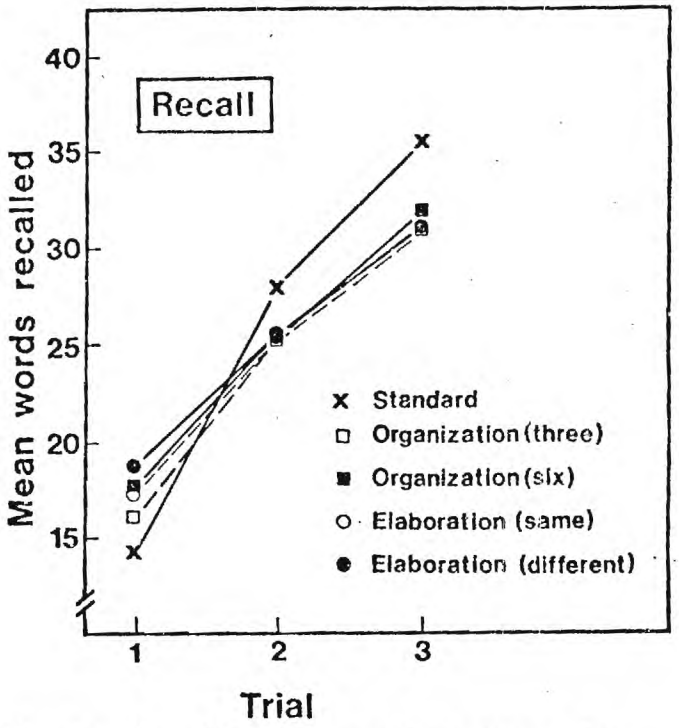

Figure 2. Recall performance for the five encoding conditions.

The faster growth across trials of the standard group was as predicted. It coincides with earlier work done on this laboratory (Winograd & Smith, 1978). While the orienting task may promote the encoding of the individual items, the optimal strategy for increased recall performance is probably an organizational strategy. Subjects under the standard learning instructions are able to use this strategy without the interference of the orienting tasks. This research shows that the orienting task can actually hinder recall performance when several trials are used. Also notice that this inhibition would not occur on single-trial free recall. The reason for this is probably that organization takes several trials to develop.

The surprizing finding in recall as indicated earlier was the failure of the organizational orienting task to promote organizational processing. There are several possible reasons for this failure. First, experimenter-provided organizational plans might not be as adequate as plans developed by the subject. Placing the items into experimenter-provided categories probably produces different organizational structures than ones that would be developed when subjects are left to their own mnemonic devices. Of course, a

(continued on page 13)

second reason for the result would be that the particular orienting task used in this experiment did not control organizational processing. While it is hard to find support for this second reason, the first has some support. Mandler (1967) found that it took many more trials for subjects to learn a particular cord-sorting scheme that someone else had developed than for subjects to develop their own consistent card sorting scheme.

Recognition performance is broken down into Figure 3. The five encoding conditions are plotted against the tree trials in the practice sequence. In recognition, while there was a main effect of encoding condition, there was no interaction between encoding condition and stage of practice. The big difference between the recognition data depicted in Figure 3 and the recall data depicted in Figure 2 is in the relative position of the standard group. While the standard groups without the orienting task surpassed the orienting task conditions in recall, the orienting tasks all produced better performance than the standard condition in recognition memory. This finding is also consistent with the literature. Subjects tend to engage in organizational strategies in anticipation of a memory test, and while optimal for recall, such a strategy is not appropriate for recognition. The orienting task conditions force the subjects to attend to the individual items, encode them in an elaborate (deep) fashion, and thus remember them better. Even though there was no significant interaction, the tendency for the orienting task conditions to look flatter than the standard condition is probably due to a ceiling effect in the recognition data.

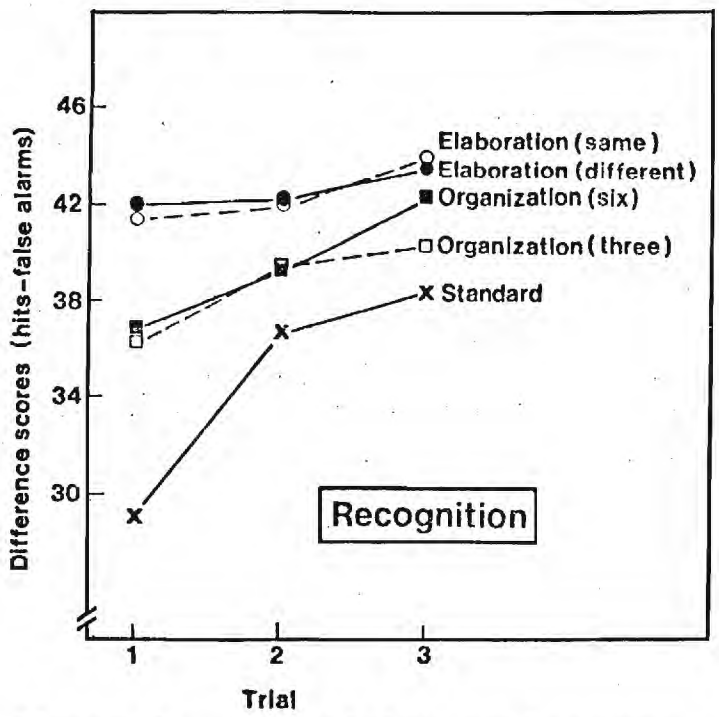

Figure 2. Recognition performance for the five encoding conditions.

In summary, the conclusions of these data are (1) orienting tasks that produce a more elaborate, deep memory trace for each of the items, produce better recognition memory for those items than a condition where subjects are left to their own mnemonic strategies. (2) In recall, the orienting conditions can eventually hinder performance. Performing the orienting task can inhibit organizational processing that is probably more optimal for recall than the individual-item processing fostered by the orienting task. (3) An organizational orienting task does not seem to improve recall performance, probably because it is experimenter-provided rather than subject-generated.

(continued on page 14)

Significance.

This research compared performance after "standard" instructions, when the subject is using his/her own mnemonic strategy, to performance after experimentally controlled orienting tasks. Such comparisons provide information about what goes on in "normal" remembering as well as in the various strategies we induce in our experimental subjects. The orienting-task paradigm is widely used in contemporary research on human memory, and the current research provides some guidance as to what these tasks do.

The story provided by these data suggest that subjects normally engage in organizational processing spontaneously, without instructions to do so. This is why orienting tasks fail to facilitate recall performance. In fact, it actually hinders performance on later trials. Orienting tasks, on the other hand, produce more appropriate processing for recognition memory, actually facilitating performance over the standard instructions.

grouped the words in their recall protocols at different places on the recall sheet. The current study forces the subject to recall each word, one after the other in a single column. This will allow organizational measures to be computed and analyzed.

Measured organization (subjective organization and clustering) will be a means of validating some of the ideas derived from the current research.